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BAKER (MICHAEL) JR INC BEAVER PA
NATIONAL DAM SAFETY PROGRAM. MAYS DAM (INVENTORY NUMBER VA 0090--ETC(U))
SEP 79 J A WALSH

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JAMES RIVER BASIN

Name of Dam: Mays Dam
Location: Amherst County, State of Virginia
Inventory Number: VA 00909

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PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

ADA 077469



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NORFOLK DISTRICT CORPS OF ENGINEERS
803 FRONT STREET
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER VA 00909	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report National Dam Safety Program MAYS DAM AMHERST COUNTY, STATE OF VIRGINIA		5. TYPE OF REPORT & PERIOD COVERED Final
7. AUTHOR(s) Michael Baker, Jr., Inc. Beaver, Pennsylvania	(15)	6. PERFORMING ORG. REPORT NUMBER DACW 65-78-D-0016
9. PERFORMING ORGANIZATION NAME AND ADDRESS James A. Walsh	8. CONTRACT OR GRANT NUMBER(s) (15) 12/51	
11. CONTROLLING OFFICE NAME AND ADDRESS U. S. Army Engineering District, Norfolk 803 Front Street Norfolk, VA 23510	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS (11) 12/51	
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	12. REPORT DATE September 1979	
	13. NUMBER OF PAGES	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.	15. SECURITY CLASS. (of this report) Unclassified	
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) National Dam Safety Program. Mays Dam (Inventory Number VA 00909), James River Basin, Amherst County, State of Virginia. Phase I Inspection Report.	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
18. SUPPLEMENTARY NOTES Copies are obtainable from National Technical Information Service, Springfield, Virginia 22151		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dams - VA National Dam Safety Program Phase I Dam Safety Dam Inspection		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) (See reverse side)		

20. Abstract

Pursuant to Public Law 92-367, Phase I Inspection Reports are prepared under guidance contained in the recommended guidelines for safety inspection of dams, published by the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

Based upon the field conditions at the time of the field inspection and all available engineering data, the Phase I report addresses the hydraulic, hydrologic, geologic, geotechnic, and structural aspects of the dam. The engineering techniques employed give a reasonably accurate assessment of the conditions of the dam. It should be realized that certain engineering aspects cannot be fully analyzed during a Phase I inspection. Assessment and remedial measures in the report include the requirements of additional indepth study when necessary.

Phase I reports include project information of the dam and appurtenances, all existing engineering data, operational procedures, hydraulic/hydrologic data of the watershed, dam stability, visual inspection report and an assessment including required remedial measures.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of the Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the design flood should not be interpreted as necessarily posing a highly inadequate condition. The design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

CONTENTS

	<u>Page</u>
Preface	i
Brief Assessment of Dam	1
Overall View of Dam	5
Section 1: Project Information	7
Section 2: Engineering Data	11
Section 3: Visual Inspection	13
Section 4: Operational Procedures	15
Section 5: Hydraulic/Hydrologic Data	17
Section 6: Dam Stability	21
Section 7: Assessment/Remedial Measures	25

Appendices

- I. Plates
- II. Photographs
- III. Check List - Visual Inspection
- IV. Check List - Engineering Data
- V. General References

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NAME OF DAM: MAYS DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Mays Dam
State: Virginia
County: Amherst
USGS 7.5 Minute Quadrangle: Forks of Buffalo, VA
Stream: Sneads Run
Date of Inspection: 23 May 1979

BRIEF ASSESSMENT OF DAM

Mays Dam is a zoned, earthfill dam approximately 300 feet long and 34 feet high. The dam, located approximately 7 miles northwest of Amherst, Virginia, is used for recreation. Mays Dam is a "small" size - "high" hazard structure as defined by the Recommended Guidelines for Safety Inspection of Dams. Visual inspection and office analyses indicate no deficiencies requiring emergency attention.

Using the Corps of Engineers' screening criteria for initial review of spillway adequacy, the 1/2 Probable Maximum Flood (1/2 PMF) was selected as the spillway design flood (SDF). The SDF was routed through the reservoir and found to overtop the dam by a maximum depth of 1.3 feet with an average critical velocity of 3.0 f.p.s. Total duration of overtopping would be approximately 1.2 hours. The spillways are capable of passing only 30 percent of the Probable Maximum Flood (PMF) and are therefore considered inadequate.

The clear seepage zone on the downstream is not considered to seriously affect the stability of the structure at this time. However, it is recommended that the rate of seepage be monitored during periods of high runoff to detect increase in flow and potential for piping of embankment materials. It is further recommended that the owner engage the services of a professional engineer to determine the stability of the downstream embankment.

It is recommended that the following remedial measures be accomplished as part of the annual maintenance of the dam: provide uniform riprap slope protection on the upstream embankment, fill and seed erosion gullies of the embankments and emergency spillway, remove trees from the embankments, remove debris from discharge channel of emergency spillway and stilling basin, and install a staff gage to monitor reservoir levels above normal pool.

NAME OF DAM: MAYS DAM

MICHAEL BAKER, JR., INC.

SUBMITTED:

ORIGINAL SIGNED BY:

JOHN E. KENNEDY

James A. Walsh
Chief, Design Branch


Michael Baker, III, P.E.
Chairman of the Board and
Chief Executive Officer

RECOMMENDED:

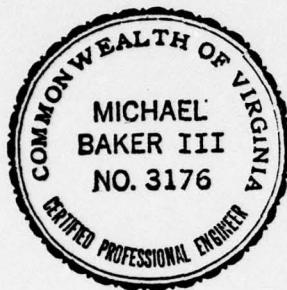
ORIGINAL SIGNED BY:
CARL S. ANDERSON, Jr.
for Jack G. Starr
Chief, Engineering

APPROVED:

Original signed by:
Douglas L. Haller
Douglas L. Haller
Colonel, Corps of Engineers
District Engineer

SEP 14 1979

Date: _____



NAME OF DAM: MAYS DAM

OVERALL VIEW OF DAM



PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM: MAYS DAM ID #VA 00909

SECTION 1 - PROJECT INFORMATION

1.1 General

1.1.1 Authority: Public Law 92-367, 8 August 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of safety inspections of dams throughout the United States. The Norfolk District has been assigned the responsibility of supervising the inspection of dams in the Commonwealth of Virginia.

1.1.2 Purpose of Inspection: The purpose is to conduct a Phase I inspection according to the Recommended Guidelines for Safety Inspection of Dams. The main responsibility is to expeditiously identify those dams which may be a potential hazard to human life or property.

1.2 Description of Project

1.2.1 Description of Dam and Appurtenances: Mays Dam is an earthfill embankment 34 feet high¹ and 300 feet long. The upstream and downstream slopes are 3:1 (horizontal to vertical) with a crest width of 28 feet.

The principal spillway consists of a 20 inch steel pipe extending through the embankment and a vertical section of 8 inch pipe in the reservoir acting as an intake and establishing normal pool.

The emergency spillway, located outside the right abutment of the dam, is a 15 foot wide, vegetated, earth side channel. The approach channel slope is approximately 3.5 percent and the discharge channel slope is 1.5 percent to 2.0 percent.

¹Measured from the downstream embankment toe to the embankment crest.

NAME OF DAM: MAYS DAM

Normal pool is maintained by the top of the vertical section of 8 inch pipe with an elevation of 760.0 feet Mean Sea Level (M.S.L.).² An 8 inch manually operated pond drain is attached at the upstream end of the 20 inch pipe.

Two smaller reservoirs are located immediately upstream of Mays Dam. The larger reservoir controls 0.2 square miles of the total drainage area (0.34 square miles) of Mays Dam and is located approximately 500 feet upstream (north) of the upper end of Mays Reservoir. The smaller reservoir is located immediately adjacent to the left (northeast) side of Mays Reservoir.

1.2.2 Location: Mays Dam is located on Sneads Run approximately 7 miles northwest of Amherst, Virginia. A Location Plan is included in this report.

1.2.3 Size Classification: The maximum height of the dam is 34 feet and the reservoir storage capacity to the top of the dam is 168 acre-feet. Therefore, the dam is in the "small" size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

1.2.4 Hazard Classification: The dam is located approximately 3/4 mile upstream of several houses. In the event of a failure of the dam, property damage and loss of life may be possible. Therefore, this dam is considered in the "high" hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams. The hazard classification used to categorize dams is a function of location only and has nothing to do with its stability or probability of failure.

1.2.5 Ownership: The dam is owned by Kenneth Mays, Route 1, Amherst, Virginia 24521.

1.2.6 Purpose of Dam: The dam is used primarily for recreation.

²All elevations are based on an assumed normal pool elevation of 760.0 feet M.S.L.

1.2.7 Design and Construction History: The dam did not have a formal design and was constructed by the owner, Kenneth Mays, excavation contractor. The dam was completed in 1974.

1.2.8 Normal Operational Procedures: The reservoir is maintained at normal pool elevation. No formal operating procedures are followed for the dam. For a more detailed operating assessment, see paragraph 4.1.

1.3 Pertinent Data

1.3.1 Drainage Area: The drainage area for Mays Dam is 0.34 square miles.

1.3.2 Discharge at Dam Site: The maximum discharge at the dam site is unknown.

Principal Spillway:
Pool level at top of dam . . . 5 c.f.s.

Emergency Spillway:
Pool level at top of dam . . . 460 c.f.s.

1.3.3 Dam and Reservoir Data: Pertinent data on the dam and reservoir is shown on the following table:

TABLE 1.1 DAM AND RESERVOIR DATA

Item	Elevation feet M.S.L.	Area acres	Reservoir Capacity		
			Acre- feet	Watershed inches	Length feet
Top of dam	766.7	12.6	168	22.5	1500
Emergency spillway crest	763.9	11.2	135	18.1	1200
Principal spillway crest (normal pool)	760.0	9.2	103	13.8	1100
Streambed at downstream toe of dam	733+	-	-	-	-

NAME OF DAM: MAYS DAM

SECTION 2 - ENGINEERING DATA

- 2.1 Design: No design data was available for this dam since no design data was developed for its construction.
- 2.2 Construction: The dam was constructed by the owner, Kenneth Mays. No records were available for this inspection.
- 2.3 Operation: There are no formal operating procedures for this dam. The previous maximum discharge at the site is unknown.
- 2.4 Evaluation: No design drawings or other data was completed for this dam. No construction records were available for review. Evaluations made in this report are based primarily on field observations, measurements taken during the inspection, and interviews with the owner. No assessment of the engineering was possible due to lack of adequate design data.

NAME OF DAM: MAYS DAM

SECTION 3 - VISUAL INSPECTION

3.1 Findings

3.1.1 General: The field inspection was made on 23 May 1979 when the reservoir was at normal pool elevation. The weather was cloudy and warm with the temperature at 78°F and ground conditions were dry. The embankment and appurtenant structures were found to be in fair condition at the time of inspection (see Plate 1 and Photos 3 and 4). The following are brief summaries of deficiencies found during the inspection. A Field Sketch of conditions is shown as Plate 1. The complete visual inspection check list is given in Appendix III.

3.1.2 Dam: The embankment was generally found to be in satisfactory condition, with no surface cracks, slumps, or other indications of instability either on the embankment or at the toe. Numerous small erosion gullies have formed in the lower portion of the downstream slope where scattered, nonmeasurable seepage is prevalent (see Plate 1 and Photos 3 and 4). An upper limit of clear seepage on the downstream embankment was very noticeable at approximate elevation 752 feet M.S.L., 8 feet below normal pool. There is good grass cover with some small trees on the downstream slope (see Overall View of Dam). Dumped riprap covers most of the upstream slope except for a section on the left side (see Photo 1 and Plate 1). A road crosses the crest of the dam and the spillway.

There is a spring with a flow of 1 g.p.m. from the hillside near the left abutment of the dam. The spring does not appear to affect the embankment (see Plate 1). There are some bare and eroded areas on the hillside at the left abutment (see Photo 2).

3.1.3 Appurtenant Structures: The principal spillway consists of an 8 inch vertical section of pipe (see Photo 5) which is connected to a 20 inch diameter horizontal steel pipe extending through the embankment and outletting near the right abutment (see Photo 6). The intake pipe appeared to be structurally sound with

NAME OF DAM: MAYS DAM

steel angles supporting both it and the reservoir drain valve and stem. The principal spillway was functioning properly. The emergency spillway has a poorly defined channel to direct flow away from the dam. The discharge slope for the emergency spillway into the stilling basin is covered with vegetation. Loose earthfill has been left in the discharge slope causing obstructions to form. Eroded gullies have developed in the soil and soft bedrock of the emergency spillway (see Photo 8) and a major portion of the lower cut slope on the right side is wet and slightly slumped.

3.1.4 Reservoir Area: The reservoir is used as a recreation area for boating, swimming, and fishing. In addition, camping sites are being prepared on the higher elevations of the surrounding slopes. There are two smaller dams with minor reservoirs on the left side and the upper end of the main reservoir.

3.1.5 Downstream Channels: The stilling basin for the outlet pipe is not lined with riprap. There is weathered bedrock in the stream bottom and a loose tree stump with debris in the basin (see Photo 6). The downstream channel is in satisfactory condition (see Photo 7).

3.2 Evaluation: Although the seepage does not appear to seriously affect the stability of the dam at this time, it should be inspected during periods of high runoff when reservoir levels may rise above normal pool. Increase in flow and/or turbidity may indicate the potential for piping of embankment material. Also, seepage areas above elevation 752 feet M.S.L. may indicate possible embankment instability. The gullies on the downstream slope and the left abutment should be graded and seeded. The trees should be removed from the downstream slope. The riprap cover on the upstream slope should be completed and graded to a uniform depth. Crest protection of a well graded crushed stone should be provided to help prevent erosion during overtopping. The emergency spillway should be graded and the trees and loose fill should be removed to form a well directed channel without obstructions. The soil and decomposed rock cut slope for the emergency spillway should be seeded with grass. The tree stump and debris should be removed from the stilling basin.

NAME OF DAM: MAYS DAM

SECTION 4 - OPERATIONAL PROCEDURES

- 4.1 Procedures: There are no formal operating procedures for Mays Dam. The water level is maintained by the vertical riser pipe.
- 4.2 Maintenance of Dam: The owner has the responsibility for operation and maintenance of the dam. Maintenance of the dam embankments and appurtenant structures should be implemented on a yearly basis.
- 4.3 Maintenance of Operating Facilities: Maintenance of the pond drain is the responsibility of the owner.
- 4.4 Warning System: At the present time, there is no formal warning system or evacuation plan in operation.
- 4.5 Evaluation: Considering the function served by the dam and the "high" hazard classification, an annual maintenance and inspection program should be instituted at which time conditions indicating the necessity for remedial measures may be detected. Repair items such as cutting grass, removing trees, preventing erosion, and controlling seepage may be recommended and completed at this time.

NAME OF DAM: MAYS DAM

SECTION 5 - HYDRAULIC/HYDROLOGIC DATA

5.1 Design: No design data was available for this report.

5.2 Hydrologic Records: No rainfall or stream flow records were available at the dam site.

5.3 Flood Experience: No exact high water marks were available. However, the owner indicated that the highest reservoir level of Mays Dam has been less than one foot above normal pool. He also indicated that the larger of the two dams immediately upstream has been approximately four feet above normal pool. The storage in the upstream dams helps to reduce fluctuations in the pool level of Mays Dam.

5.4 Flood Potential: The Probable Maximum Flood (PMF) and 1/2 Probable Maximum Flood (1/2 PMF) were developed and routed through the reservoir by utilizing the HEC-1 DB computer program (Reference 9, Appendix V) and appropriate unit hydrograph, precipitation, and storage-outflow data. The effects of storage and discharge from the reservoir 500 feet upstream were considered in the flood routings. The effects of the small reservoir adjacent to the left side of Mays Reservoir were considered minor and therefore were neglected in the flood routings. Clark's Tc and R coefficients for the local drainage areas were estimated from basin characteristics. The rainfall applied to develop the unit hydrograph was obtained from the U.S. Weather Bureau's publications (Reference 5 and 16, Appendix V). Losses were estimated at an initial loss of 1.0 inch and a constant loss thereafter of 0.05 inch per hour.

5.5 Reservoir Regulation: Pertinent dam and reservoir data are shown in Table 1.1, paragraph 1.3.3.

Regulation of flow from the reservoir is automatic. Normal pool is maintained by the top of the 8 inch section of vertical pipe (crest elevation of 760 feet M.S.L.). Water entering this pipe flows through the dam in a 20 inch diameter steel outlet pipe. Water also flows past the dam through the ungated, emergency spillway in the event water in the reservoir rises above an elevation of 763.9 feet M.S.L.

Outlet discharge capacity, reservoir area and storage capacity, hydrograph data, and flood routing were computed as part of this report. The flood routings were begun with the reservoir level at normal pool. Outlet discharge capacity includes discharge from both the principal and emergency spillways.

NAME OF DAM: MAYS DAM

5.6 Overtopping Potential: The probable rise of the reservoir and other pertinent information on reservoir performance are shown in the following table:

TABLE 5.1 RESERVOIR PERFORMANCE

Item	Hydrographs		
	Normal	1/2 PMF	PMF(a)
Peak flow, c.f.s.			
Inflow	0.5	2510	5040
Outflow	0.5	2074	4780
Peak elev., ft. M.S.L.	760.0(b)	768.0	769.2
Emergency spillway (c) (elev. 763.9 feet M.S.L.)			
Depth of flow, ft.	-	2.7	3.5
Average velocity, f.p.s.	-	9.4	10.6
Duration of flow, hrs.	-	10.3	12.6
Non-overflow section (elev. 766.7 ft. M.S.L.)			
Depth of flow, ft.	-	1.3	2.5
Average velocity, f.p.s.	-	3.0	4.1
Total duration of overtopping hrs.	-	1.2	3.5
Tailwater elev., ft. M.S.L.(d)	733.5	-	-

- (a) The PMF is an estimate of flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in a region.
- (b) All elevations are based on the assumed elevation of 760.0 feet M.S.L. for normal pool.
- (c) Depth and velocity estimates were based on critical depth at control section.
- (d) Tailwater at time of inspection.

5.7 Reservoir Emptying Potential: An 8 inch gate valve in the reservoir at the upstream end of the 20 inch outlet pipe is available to dewater the reservoir. The time to dewater the reservoir from normal pool is approximately 9 days. Reservoir drawdown was computed neglecting inflow.

5.8 Evaluation: Mays Dam is a "small" size - "high" hazard dam requiring evaluation for a spillway design flood (SDF) equal to 1/2 PMF. The 1/2 PMF was routed through the reservoir and found to overtop the dam by a maximum depth of 1.3 feet with an average critical velocity of 3.0 f.p.s. Total duration of overtopping was 1.2 hours. The spillways are capable of passing only 30 percent of the PMF.

NAME OF DAM: MAYS DAM

Conclusions pertain to present day conditions and the effect of future development on the hydrology has not been considered.

NAME OF DAM: MAYS DAM

SECTION 6 - DAM STABILITY

6.1 Foundation and Abutments: No recorded information was available regarding the foundation material. It was reported by Ken Mays, the owner, that the cut-off trench was excavated 12 feet deep and 14 feet wide to firm bedrock (possibly gneiss) in sandy and clayey silts with rock fragments at the centerline of the dam. A core zone was reportedly constructed of compacted clay in the cut-off trench to near the top of the dam with more granular type material upstream and downstream in the embankment shell. Mr. May did not indicate that internal drains were provided and no evidence of such a system, such as outlets, was noted during the inspection. He indicated that compaction was achieved by earthmoving equipment and a bulldozer; a roller was not used.

The abutments consist of sandy and clayey silts with decomposed gneiss exposed near the surface in erosion gullies.

Except for the cut-off trench, the dam was apparently constructed directly on the 12 foot thick alluvial sandy and clayey silts overlying gneiss bedrock.

6.2 Stability Analysis

6.2.1 Visual Observations: During the inspection, no unusual movement or cracking was observed at or beyond the toe. There was no evidence of sloughing. The ground surface at the time of the inspection was generally dry outside the seepage areas.

Numerous shallow (6 to 12 inches deep) gullies resulting from seepage have formed in the lower 15 feet of the downstream slope. The small amount of flow in the individual gullies was not measurable but there is a wet area next to the embankment toe which drains into the adjacent stream. A spring in the hillside near the left abutment was measured at 1 g.p.m. and seepage at the right abutment was too small to measure. Although these wet areas are scattered along the downstream slope, they lie below a relatively well defined line at approximate elevation 752 feet M.S.L., approximately 8 feet below normal pool and approximately 15 feet above the toe. The seepage is clear.

NAME OF DAM: MAYS DAM

The downstream embankment is well vegetated and has a 3:1 slope. Scattered small trees are also located on the embankment.

The surface of the dam is covered with red and brown clayey and sandy silt; the crest of the dam is covered with brown silty sand containing rock fragments. The 3:1 embankment slopes are relatively uniform.

The emergency spillway has erosion gullies and considerable debris on the discharge slope.

- 6.2.2 Design and Construction Data: No stability calculations or as-built construction drawings are available.
- 6.2.3 Operating Records: The structure has no instrumentation for indicating movements, deflections, pore pressure, or other pertinent information concerning stability. There are no records of inspections.
- 6.2.4 Post-Construction Changes: No unusual post-construction changes have been made in the dam or in the watershed area which would substantially affect the water level.
- 6.2.5 Seismic Stability: Mays Dam is located in Seismic Zone 2 and is considered to have no hazard from earthquakes, according to the Recommended Guidelines for Safety Inspection of Dams, provided that static stability conditions are satisfactory and conventional safety margins exist.

- 6.3 Evaluation: Although embankment stability analyses were not made for the design of this dam, 3:1 embankment slopes with a crest width of 28 feet would normally be stable for conventional dams of this height (34 feet). The dam at the time of the inspection appeared to be stable with no indications of instability other than the small amount of clear seepage occurring on the downstream slope. The top of the seepage area at approximate elevation 752 feet M.S.L. may be the point at which the phreatic line intersects the downstream slope, particularly since there does not appear to be an internal drainage system. The top of the alleged clay core may lie below normal pool elevation 760 feet M.S.L., thereby causing seepage through the more permeable shell soils. This condition would be more likely to

occur if adequate compaction was not attained during construction of the shell. Therefore, it is recommended that the seepage areas on the downstream slope be visually inspected during all periods of high reservoir levels to determine (1) any increases in turbidity and/or (2) increases in the rate of seepage. In the interim, a qualified professional engineer should be engaged to investigate the stability of the embankment. These analyses should be made based on full loading conditions with a high phreatic line or on conditions determined from a subsurface investigation.

The thickness of the stone riprap on the upstream slope is uneven in places and does not cover the left side. The irregular areas should be regraded to a uniform depth and the bare areas covered with adequately sized riprap on proper bedding material.

In the emergency spillway, the wet area in the right cut slope should be graded and seeded to prevent erosion. The debris, excessive live vegetation, and loose soil fill at the discharge end of the spillway on the slope above the stilling basin should be removed to prevent blockage.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURE

7.1 Dam Assessment: The dam and appurtenant structures are generally in fair overall condition. No deficiencies were discovered during the field inspection and office analyses which would indicate the need for emergency attention.

Using the Corps of Engineers' screening criteria for the initial review of spillway adequacy, the 1/2 PMF was selected as the SDF for the "small" size - "high" hazard classification of Mays Dam. It has been determined that the dam would be overtopped by the SDF by a maximum depth of 1.3 feet with an average critical velocity of 3.0 f.p.s. Total duration of overtopping would be 1.2 hours. The spillways are capable of passing only 30 percent of the PMF and are therefore considered inadequate.

The downstream slope (3:1) and the width of the crest (28 feet) help to add to the margin of safety for stability. Although the zone of clear seepage does not appear to seriously affect the stability of the structure at this time, it should be checked during periods of high runoff for increase in flow and/or turbidity which may indicate the potential for piping of embankment material. In the interim, the owner should engage the services of a professional engineer to investigate the stability of the downstream embankment.

The recommended remedial measures are not considered urgent and, therefore, may be accomplished as part of the annual maintenance for the dam.

7.2 Recommended Remedial Measures: The following repair items should be completed as part of the general maintenance of the dam:

- 1) Place additional well graded rock on the uncovered portion of the upstream embankment slope. Grade uneven existing piles of stone to provide uniform slope protection.
- 2) Provide crest protection with a well graded crushed stone.
- 3) Fill and seed erosion gullies on downstream slope.
- 4) Grade and seed bare eroded areas at left abutment.
- 5) Remove small trees from embankment slopes.

NAME OF DAM: MAYS DAM

- 6) Remove tree stumps and debris from stilling basin.
- 7) Regrade emergency spillway to remove erosion gullies and provide a defined channel away from the dam. The regraded channel should be fertilized and seeded.
- 8) Remove loose fill, debris, and excessive vegetation from the discharge channel of emergency spillway.
- 9) Seed the right cut slope of the emergency spillway.
- 10) Install a staff gage to monitor reservoir levels above normal pool.
- 11) Initiate a yearly maintenance and inspection program.

NAME OF DAM: MAYS DAM

APPENDIX I

PLATES

CONTENTS

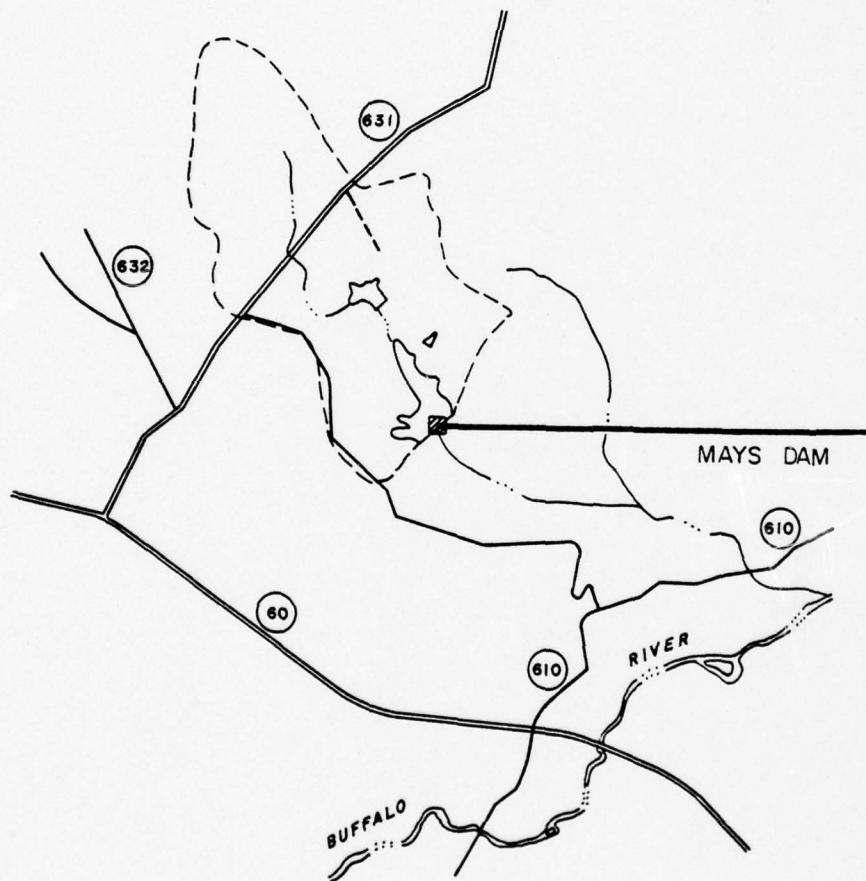
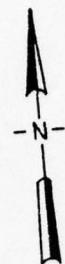
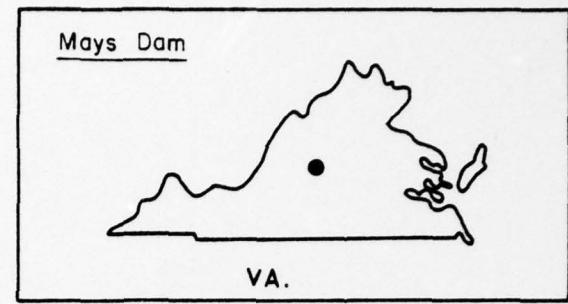
Location Plan

Plate 1: Field Sketch - Plan of Dam

Plate 2: Typical Section

**Plate 3: Profile of Top of Dam and Centerline of
Emergency Spillway**

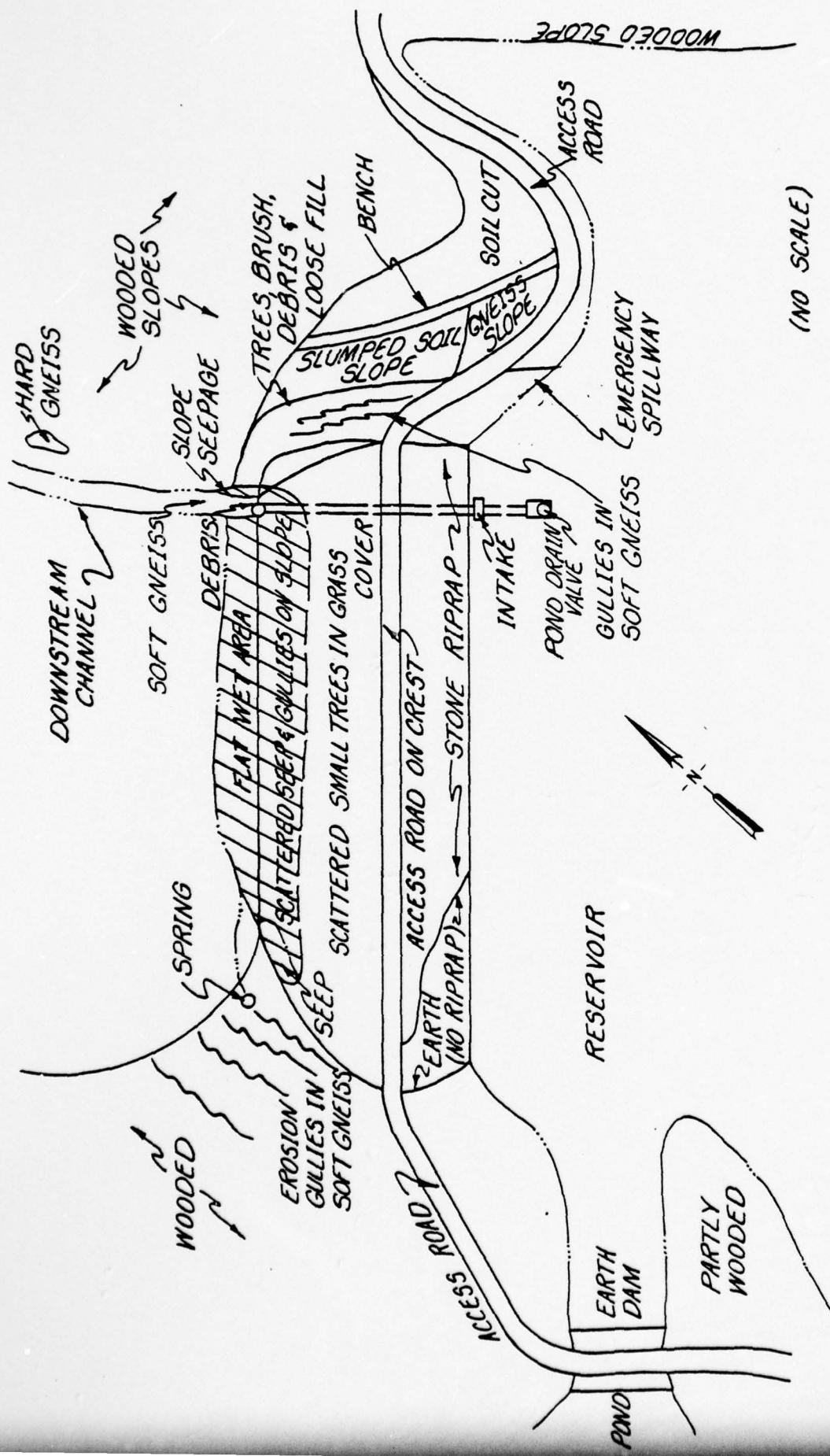
NAME OF DAM: MAYS DAM



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SCALE

LOCATION PLAN

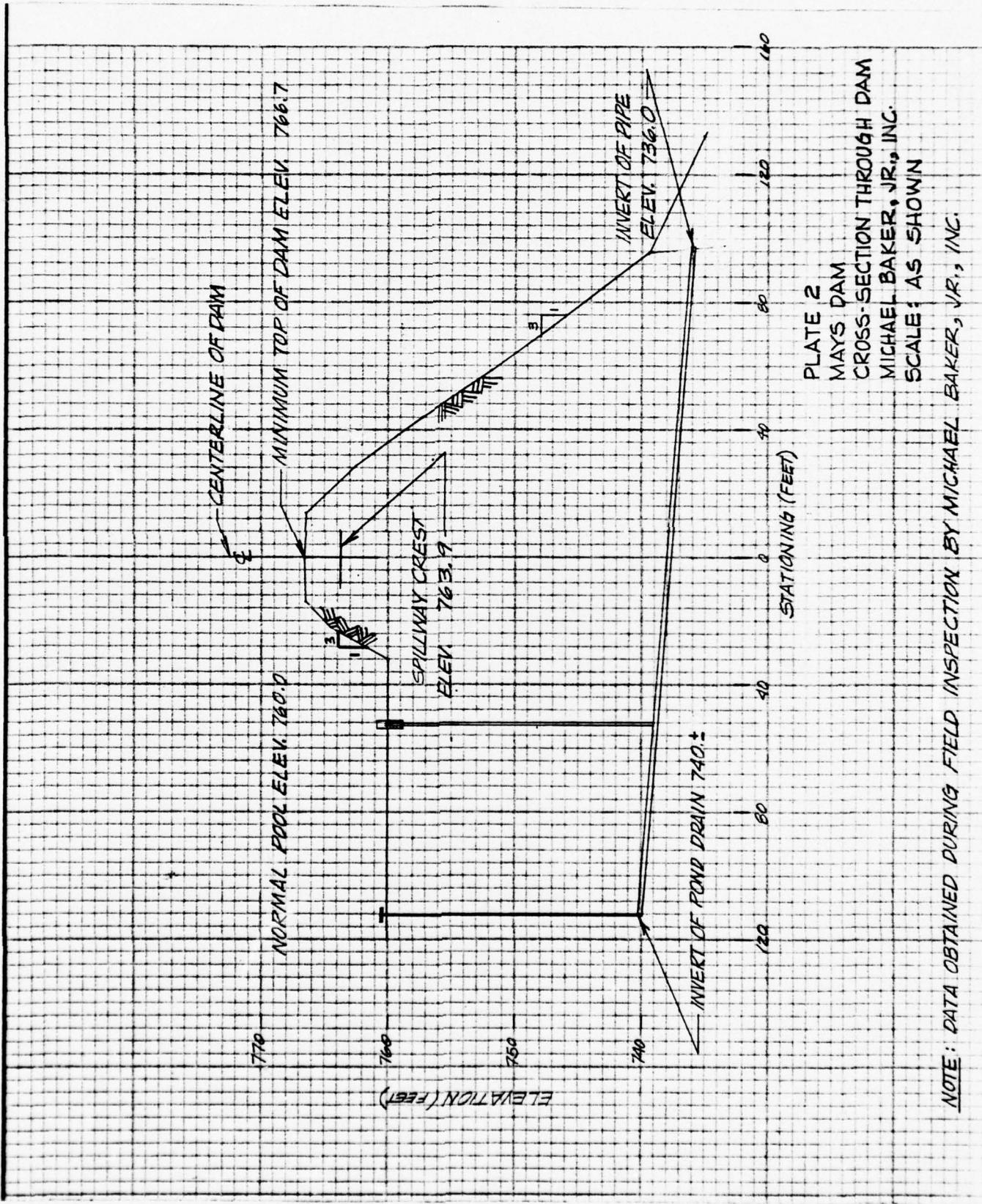
MAYS DAM



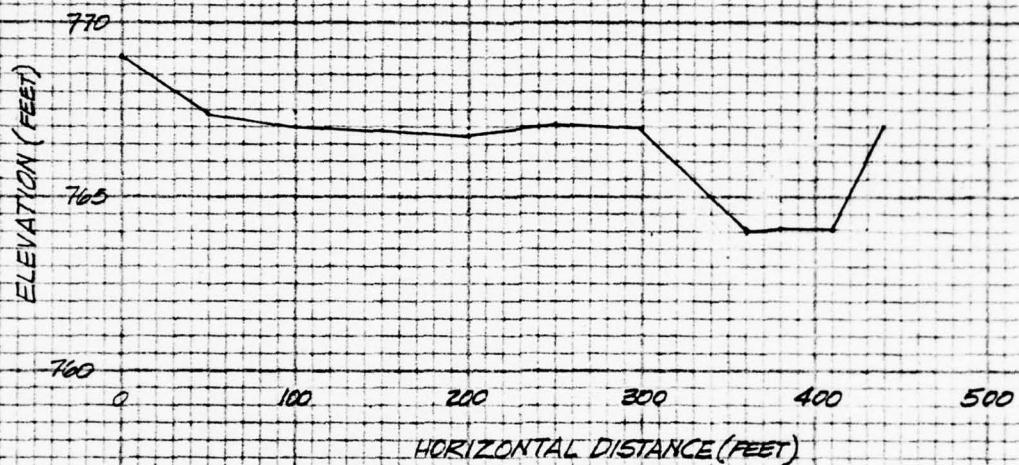
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FIELD SKETCH
 MAYS DAM
 Michael Baker, Jr., Inc.
 July 1979
 PLATE I

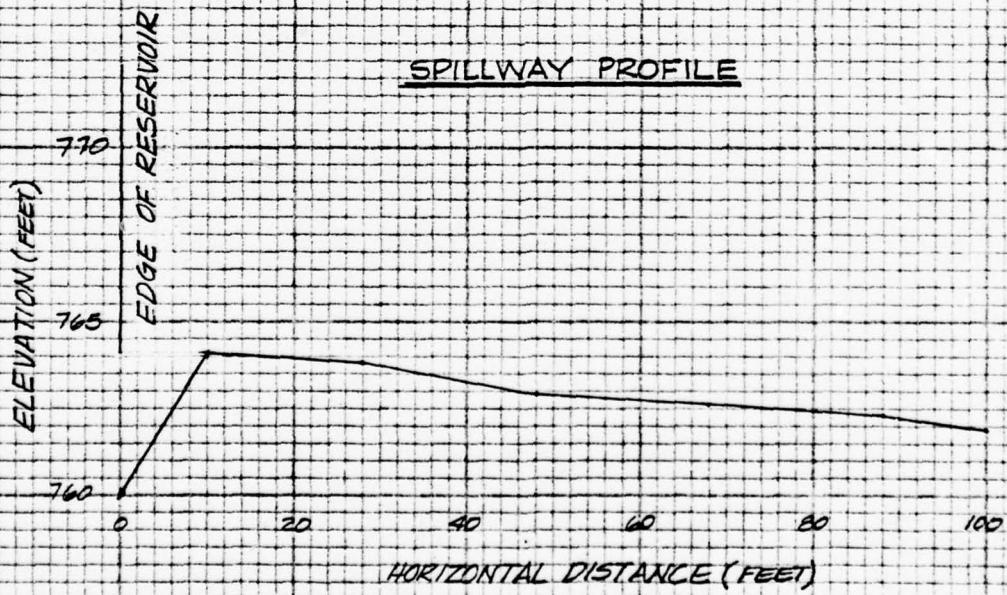
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TOP OF DAM PROFILE



SPILLWAY PROFILE



NOTE: DATA OBTAINED DURING FIELD INSPECTION BY MICHAEL BAKER, JR., I.I.C.

PLATE 3

MICHAEL BAKER, JR., I.I.C.

SCALE: AS SHOWN

APPENDIX II

PHOTOGRAPHS

CONTENTS

- Photo 1: Upstream Face of Dam Showing Dumped Rock and Cut Slope of Emergency Spillway at Right Abutment
- Photo 2: Eroded Area on Left Abutment
- Photo 3: Close-up View of Seepage Area Located Near Right Side of Outlet Pipe
- Photo 4: Close-up View of Seepage Area Located to the Left of the Outlet Pipe at Downstream Toe of Dam
- Photo 5: Intake Structure (Left) and Reservoir Drain Valve (Right) of Principal Spillway
- Photo 6: Outlet Pipe and Debris in Stilling Basin
- Photo 7: Downstream Channel
- Photo 8: Erosion in Discharge Channel of Emergency Spillway

Note: Photographs were taken on 23 May 1979.

MAYS DAM



**PHOTO 1. Upstream Face of Dam Showing Dumped Rock
and Cut Slope of Emergency Spillway at Right Abutment**

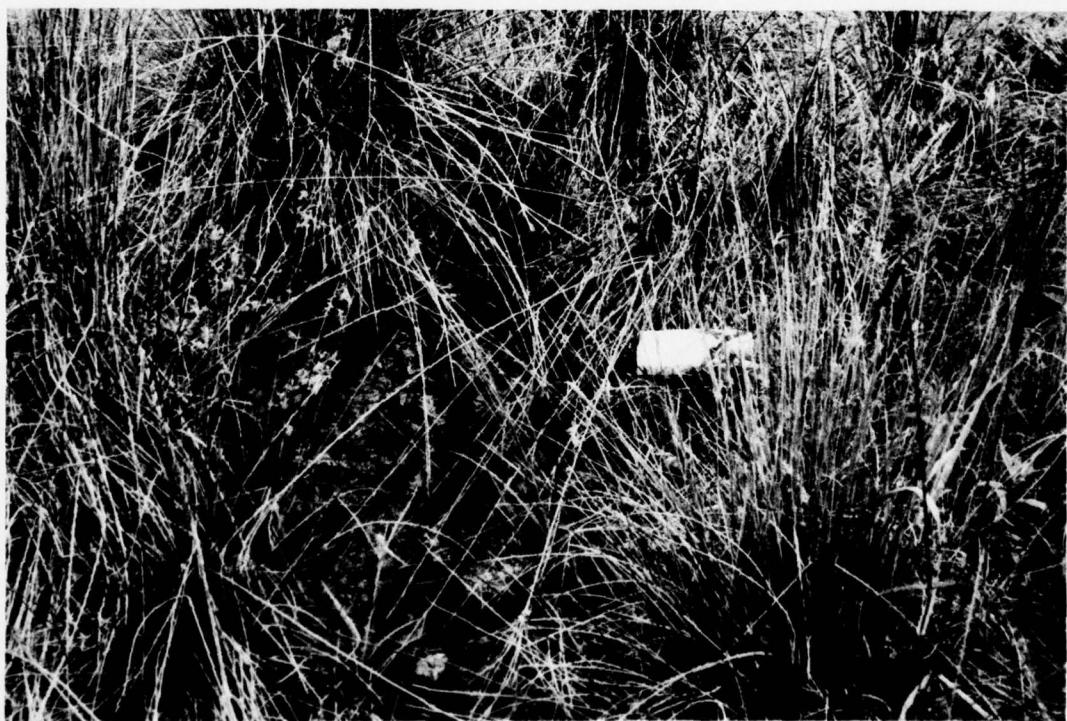


PHOTO 2. Eroded Area on Left Abutment

MAYS DAM



PHOTO 3. Close-up View of Seepage Area Located Near Right Side of Outlet Pipe



**PHOTO 4. Close-up View of Seepage Area Located to the Left of the Outlet Pipe
at Downstream Toe of Dam**

MAYS DAM



PHOTO 5. Intake Structure (Left) and Reservoir Drain Valve (Right) of Principal Spillway



PHOTO 6. Outlet Pipe and Debris in Stilling Basin

MAYS DAM



PHOTO 7. Downstream Channel



PHOTO 8. Erosion in Discharge Channel of Emergency Spillway

APPENDIX III

CHECK LIST - VISUAL INSPECTION

Check List
Visual Inspection
Phase 1

Name of Dam	<u>Mays Dam</u>	County	<u>Amherst</u>	State	<u>Virginia</u>	Coordinates	<u>Lat. 3740.1</u>
							<u>Long. 7909.1</u>
Date	Inspection	<u>23 May 1979</u>	Weather	<u>Cloudy</u>	Temperature	<u>78°F.</u>	

Pool Elevation at Time of Inspection 760.1 ft. M.S.L. Tailwater at Time of Inspection 733.5 ft. M.S.L.

NOTE: All elevations are based on an assumed lake elevation of 760.0 ft. M.S.L.

Inspection Personnel:
Virginia Water Control Board:

R. Gay

Michael Baker, Jr., Inc. : Owner's Representatives:

T. W. Smith
J. M. Thompson
W. L. Sheaffer

Kenneth Mays

W. L. Sheaffer

Recorder

EMBANKMENT

Name of Dam: MAYS DAM

<u>VISUAL EXAMINATION OF</u>	<u>OBSERVATIONS</u>	<u>REMARKS OR RECOMMENDATIONS</u>
<u>SURFACE CRACKS</u>	None observed	
<u>UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE</u>	None observed	
<u>SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES</u>	No sloughing was observed in the embankment. Numerous small gullies (0.5-1.0 ft. deep) have formed on the downstream slope, especially in the lower portion, due to seepage and surface runoff. There is some erosion at the left abutment caused by a lack of vegetation.	It is recommended that the larger gullies be filled with earth and seeded.
<u>VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST</u>	The horizontal alignment of the crest is straight and runs in approximately a north-east to southwest direction. Vertical alignment was good with only 0.5 ft. of variance along the crest.	
<u>RIPRAP FAILURES</u>	Riprap covers most of the surface to the shoreline except in the vicinity of the left abutment. No slope failures were observed in the riprap.	Even grading of the rock piles and complete coverage of the slope on the left side should be implemented for uniform protection.
<u>SLOPES</u>	The downstream embankment is generally well covered with vegetation, and includes some scattered small trees. There is similar vegetation on the upstream slope except for the riprapped areas. The downstream embankment slopes approximately 3:1.	The trees should be removed.

Name of Dam: MAYS DAM

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONSTRUCTION MATERIALS	The surface of the dam is covered with red and brown clayey and sandy silt with brown silty sand and rock fragments at the crest. Ken Mays, builder and owner, stated that to reduce seepage he placed a 14 ft. wide core of red clay from the bottom of the key trench to near the top of the dam. Earth moving equipment and a bulldozer were used for compaction. A roller was not used.	The dam was built with no design plan or specifications.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Reddish brown sandy and clayey silt was observed at the left abutment. Decomposed gneiss is exposed near the surface. Reddish brown clayey silt and sandy silt with rock fragments overlie decomposed gneiss at relatively shallow depths at the right abutment adjacent to the spillway.	
ANY NOTICEABLE SEEPAGE	Numerous seeps in small to moderately large wet areas in the lower 15 ft. of the downstream slope were observed. The flow was too small to measure except for an estimated 0.3 g.p.m. in the earth slope gutter at the lower left abutment. There is a spring (1 g.p.m.) in the nearby hillside. The seepage at the right abutment was too small to measure. There is a wet area extending along the toe of the dam with a variable width (30 ft. maximum). The water drains into the adjacent stream channel.	The seepage areas are numerous but the flow appears to be minor. Filling and seeding of the significant gullies are recommended. Periodic inspection is suggested.
STAFF GAGE AND RECORDER	None observed	Install staff gage to monitor reservoir levels above normal pool.
DRAINS	No drains were observed or reportedly installed during construction.	

EMBANKMENT

Name of Dam: MAYS DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
FOUNDATION	No boring records were available. The soils under the dam apparently consist of sandy and clayey silts with rock fragments overlying bedrock (possibly gneiss). Ken Mays, owner, stated that a cut-off trench was dug 12 ft. deep x 14 ft. wide to bedrock and backfilled with clay to prevent seepage between abutments beneath the dam. Written verification was not available. The bedrock is the Marshall Formation of the Blue Ridge Complex (Pre-Cambrian) on the state geologic map.	

Name of Dam:	MAYS DAM	OUTLET WORKS
VISUAL EXAMINATION OF		OBSERVATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT		The outlet conduit is a 20 in. O.D. steel pipe.
INTAKE STRUCTURE		The intake structure consists of the 20 in. steel pipe extending through the dam and a vertical section of 8 in. pipe acting as an intake and fixing normal pool. A steel tank cut in two and inverted over the 8 in. pipe protects it from debris.
OUTLET STRUCTURE		The 20 in. steel conduit discharges into the stream channel at the toe of the dam near the right abutment.
OUTLET CHANNEL		The stilling basin is approximately 40 ft. x 20 ft. with soft decomposed gneiss in the bottom. The slopes consist of reddish brown sandy silt with rock fragments. There is minor seepage at the toe of the hill on the right side. There is no riprap slope protection. A loose tree stump was present in the channel with debris on the banks.
EMERGENCY GATE		An 8 in. gate valve is located on the upstream end of the 20 in. steel outlet pipe approximately 25 ft. upstream of the 8 in. intake pipe. The valve is located near the bottom of the reservoir about 20-25 ft. below normal pool.

Name of Dam: MAYS DAM

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONTROL SECTION	The control section is 15 ft. wide and 10-15 ft. long with a crest elevation of 763.9 ft. M.S.L.	
APPROACH CHANNEL	Red clayey silt with rock fragments overlie weathered soft to hard gneiss in an unevenly formed channel with a cut at the base of a hill. There is a road crossing with a drainage ditch outletting into the channel. The surface is mostly bare with an approximately 3.5% adverse slope.	The approach channel should be graded to form a confined and better directed channel. The surface should be seeded.
DISCHARGE CHANNEL	The discharge channel is restricted and poorly formed. Loose soil fill has been bulldozed over and around trees providing an impeded outlet on a steep slope into the stilling basin at the end of the principal spillway. Seeps discharge an estimated 1 g.p.m. from the end of the spillway into the basin. Erosion gullies are present in the soil and soft gneiss. The discharge channel is inadequately vegetated with a 1.5% to 2.0% slope.	The channel is inadequate and should be graded to remove debris and to form restraining slopes. The channel should then be seeded.
BRIDGE AND PIERS	Not Applicable	
SLOPES	The cut in the hill on the right side is in medium hard gneiss with wavy, indistinct foliation which dips 90° to 80° SW and strikes N 40° E (approximately parallel to the dam alignment) near the reservoir. The adjacent rock has decomposed. A major portion of the lower slope downstream is cut into wet, eroded, and slumped sandy silt. There is a bench a bore and a cut in decomposed gneiss with red clayey silt at the top. The cut on the left side adjacent to the dam is shallow in soft decomposed gneiss and thin soil cover.	The slumps in the cut slopes do not appear to be serious but could slide in wet seasons. It is recommended that the soil and decomposed rock slope be seeded.

Name of Dam: MAYS DAM

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed	
OBSERVATION WELLS	None observed	
WEIRS	None observed	
PIEZOMETERS	None observed	
OTHER		

RESERVOIR

Name of Dam: MAYS DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	The slopes range from gentle to steep. The area is partially wooded with open grassy sections adjacent to the reservoir. A bench area is being constructed at the upper end of the reservoir. The soil consists of sandy and clayey silt with rock fragments. There are a few small outcrops of bedrock.	
SEDIMENTATION	Two smaller dams immediately upstream of Mays Dam act to trap nearly all sediment before water flows into the dam. Therefore, sedimentation in Mays Dam is very minor.	

DOWNSTREAM CHANNEL

Name of Dam:	MAYS DAM	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The downstream channel was observed to be in good condition with no obstructions or debris.		
SLOPES	The slopes are well defined and cut into red sandy silt with rock fragments at the toe of a hill on the right side of the valley. They appear to be stable.		
APPROXIMATE NO. OF HOMES AND POPULATION	Several houses are located approximately 3/4 mi. downstream with an estimated population of 8.		

APPENDIX IV

CHECK LIST - ENGINEERING DATA

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Name of Dam:	MAYS DAM	ITEM	REMARKS
PLAN OF DAM	None available. See Field Sketch.		
REGIONAL VICINITY MAP	The vicinity map is presented in this report as the Location Plan.		
CONSTRUCTION HISTORY	Ken Mays, the owner, constructed the dam in 1974.		
TYPICAL SECTIONS OF DAM	None available. See Plate 2 for inspection survey typical section.		
HYDROLOGIC/HYDRAULIC DATA	None available		
OUTLETS - PLAN and DETAILS	None available	- CONSTRAINTS and DISCHARGE RATINGS	None available
RAINFALL/RESERVOIR RECORDS	None available		

Name of Dam: MAYS DAM

ITEM	REMARKS
DESIGN REPORTS	None available
GEOLOGY REPORTS	None available
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None available
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None available
POST-CONSTRUCTION SURVEYS OF DAM	None available

BORROW SOURCES Borrow was reportedly obtained from the reservoir area and the abutment slopes.

Name of Dam: MAYS DAM

ITEM	REMARKS
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MONITORING SYSTEMS No monitoring systems have been provided.

MODIFICATIONS Not Applicable

HIGH POOL RECORDS None available

POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS None available

PRIOR ACCIDENTS OR FAILURE OF DAM
DESCRIPTION REPORTS
No prior accidents or failure of the dam have been noted.

Maintenance
OPERATION
RECORDS
None available

Name of Dam: MAYS DAM

<u>ITEM</u>	<u>REMARKS</u>
SPILLWAY PLAN ,	
SECTIONS , and DETAILS	None available. See Plate 3 for Spillway Profile from the inspection survey.
OPERATING EQUIPMENT PLANS & DETAILS	None available

APPENDIX V

GENERAL REFERENCES

GENERAL REFERENCES

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NAME OF DAM: MAYS DAM